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International Journal of Civil Engineering and Technology (IJCIET) Volume 9, Issue 8, August 2018, pp. 1013–1022, Article ID: IJCIET_09_08_ 103 Available online at http://www.iaeme.com/ijciet/issues.asp?JType=IJCIET&VType=9&IType=8 ISSN Print: 0976-6308 and ISSN Online: 0976-6316 © IAEME Publication Scopus Indexed DEVELOPMENT OF PARKING ACCOUNTING INFORMATION SYSTEMS BASED SMARTPHONE IN INDONESIA Hariadi Yutanto, Nanang Shonhadj, Romi Ilham and Diah Ekaningtias STIE Perbanas Surabaya, Departement of Accounting, Indonesia ABSTRACT The potential of regional income derived from parking fees is very high, therefore some major cities in Indonesia such as Surabaya, Bandung and Jakarta have implemented a parking management model from a secure manual. Currently the local revenue of cities and districts governments from parking fee was still low and declining. The objective is to mobilize regional income through the development of public information system based on smartphone. The specific target to be achieved is to build the network from the automatic teller machine to another system. This study aims to create smartphone-based parking applications with System Development Life Cycle (SDLC) method, from analysis, design, development to testing and simulation. The results of research for the local government strongly support the development of smartphone-based applications with the System Development Lifecycle method (SDLC). The proposed e-parking system can manage the management of parking charges. Through this system the local government can monitor all parking transactions easily and in real time. The e-parking system is easy to maintain and develop, in addition to the e-parking support tools are easily obtained with a relatively cheap price. Key words: Accounting Information Systems; Smart Phone, Parking, Computer and QR-Code. Cite this Article: Hariadi Yutanto, Nanang Shonhadj, Romi Ilham and Diah Ekaningtias, Development of Parking Accounting Information Systems Based Smartphone in Indonesia. International Journal of Civil Engineering and Technology, 9(8), 2018, pp. 1013 -1022. http://www.iaeme.com/IJCIET/issues.asp?JType=IJCIET&VType=9&IType= 8 1. INTRODUCTION The cities and districts governments in Indonesia are directed to increase local revenue to finance the construction of the main facilities and infrastructure needed by the community. Potential sources of income for development finance are parking retribution fees [1]. The problems of parking in cities and districts in Indonesia are complex, such as the number of illegal parking attendants, limited parking lots, the number of parking attendants who charge parking fees above the prevailing regulations and traditional parking management. The impact was the management of the source of income from the parking is not coordinated well, so that the original revenue that should be optimized by the city and regency government is not optimal and tend to lose, [2] indicates that the potential revenue of local parking taxes potentially contributed positively and increase acceptance local revenue, but the realization of parking tax decreased from year to year. [1]; [3] and [4] said that illegal activities and lack of good policy support and local revenue management rules will cause local governments to lose their local revenue in the short term. The Department of Transportation and Communication in each city and district in Indonesia has conducted surveillance and control of parking activities through a series of activities such as: handling by collecting parking workers, providing guidance, giving statements of duty, and giving them uniforms. All activities are directed to improve parking services to the community, but the reality in the field is still the number of illegal levies practices that harm the city and district governments in Indonesia. In big cities like

Jakarta, Surabaya, Bandung and Padang have implemented Parking Meter or so-called ATM Parking. Based on field data obtained through the survey has informed that the application of parking meters is still considered not optimal because the driver is reluctant to buy the card, the location of parking meters far enough from the parking area, and the use of cards that require drivers to stick the card when parking and leaving the location. This study aims to development of accounting information systems based on smartphone a mobile phone that can improve services and avoid illegal fees that increase the local revenue of the cities and districts in Indonesia. In contrast to parking meters, mobile parking can further facilitate the parking attendants who are managing the vehicle. Users who will park directly to the mobile parking counter to be verified, so that the driver does not need to be bothered. 2. REVIEW OF LITERATURE [5]; [6] and [7] said that the development of parking information system has been varied and implemented in schools, malls, buildings, offices etc. Broadly speaking the development of existing application systems can be divided into three applications. The first application is a desktop base, this app can run independently without using a browser or internet connection in a computer, with a specific operating system or platform. The second type of application is web-based, this app can run using a web technology base or browser. This app can be accessed anywhere as long as there is a supported internet connection without the need to install on any computer like a desktop application, simply by opening the browser and to where the application server is installed. Parking consists of three types, namely the curbside parking, outside of the road, and a parking lot. The local revenue from district government of a type of roadside parking is called the public road parking service levy, the local revenue of the off-street parking type is called Parking Tax, whereas the local (genuine) revenue of the special parking is called a parking space levy. Local government regulation 9 Year 2011, Parking Tax is a tax on the provision of off-street parking spaces, whether provided in connection with the principal of business as well as provided as a business, including the provision of motor vehicle nurseries. Local Government Regulation No. 1 of 2017 describes roadside parking service levies directed to motorized vehicles parked along roads and incidental parking. Incidental parking is reserved for motor vehicles in the event of a certain activity. According to local regulation No. 22 of 2011, the object of parking are a special parking place provided, owned or managed by the regional government, covering: parking lot and parking infrastructure. The third type of app is car-based, the app is at first glance almost the same as web-based but there are four differences that make it different when viewed from features, user interaction, location awareness and push notifications. While the connection view of the application there are two types of connections, namely online connection, which means we connect to the internet or the virtual world, whether connected through social media accounts, email and various other types of accounts we use [8] and [9]. Although offline is a term for our terms not connected to the internet, more precisely not connected. In connection with the application to be developed, then this application is a mobile-based application with online connection. Further development of this parking system application has also been done by [10]. He designed vehicle parking system through android. [11] said that Radio Frequency Identification (RFID) embedded in a card that carries students and lecturers was also could implement to manage parking services in school or universities area. It later when passing through the parking gate it will instantly detect passing vehicles, this app is an offline desktop base application made with Borland Delphi 7 programming language and connected to MySQL database. Based on existing research, the fundamental difference with this research lies in the development of mobile-based parking information system with online connection. Accounting parking information system is a set of interconnected components that collect, process, store, and distribute

information to support decision making and control over parking activities within an organization [10]. In addition to supporting decision-making, coordination, and control, parking accounting information systems can also help managers and workers analyze problems, visualize complex subjects that occur in parker activity. With the accounting information system data is formed into a meaningful and useful for the increase in regional income [8]; [9] and [11]. The professional management of parking management makes it easy for companies to analyze the need for parking reports to determine their next business strategy. The speed of data transfer and provision of reports will not be realized if the management is still done manually. Sitemap parking accounting information system is useful to raise the company's brand and a good impression of visitors from entering the area, improving vehicle safety, reducing the queue of vehicles entering because the recording has been through the computer, the error of parking attendant error in recording the number and hours of vehicle entry and replacement of the card parking manual that is out of date that can be used for crime vehicle theft 3. RESEARCH METHOD 3.1. Quick Response Code (QR-Code) QR code or commonly known as QR (Quick Response) Code is a form of evolution of bar code from one dimension into two dimensions. The use of QR codes is very prevalent in Japan. This is because the ability to store data larger than the bar code so as to encode information in Japanese because it can accommodate kanji. The QR Code has received international standardization and standardization from Japan in the form of ISO / IEC18004 and JIS-X-0510 and has been widely used through mobile phones in Japan (http://id.wikipedia.org/wiki/Kode_QR). The QR code is a type of matrix code or two-dimensional bar code developed by Denso Wave, a division of Denso Corporation which is a Japanese company and published in 1994 with the main functionality that can be easily read by the scanner. QR is an abbreviation of a quick response that fits its purpose is to convey information quickly and get a fast response as well. In contrast to barcodes, which only store information horizontally, QR codes are able to store information horizontally and vertically, therefore automatically QR codes can hold more information than the barcode [10]. QR (quick response) codes are two dimensional images that when scanned by a smart phone's camera, prompt the smart phone to open a web-page or display an image, video, numeric, or text [12]. QR code scanner application is able to decode information encryption in QR code [13]. Hence this research focuses on use of user interface including navigations for enhancing efficiency of parking system. Figure 1 Scanning QR Code 3.2. Android The Operating System is software in the first layer that is placed on the computer memory at the time the computer is turned on. While other software run after the Operating System runs, and the Operating System will perform a common core services for the software. Common core services such as disk access, memory management, scheduling tasks, and user interfaces. So that each software no longer need to perform these common core tasks, because it can be served and performed by the Operating System. The section of code that performs these common and core tasks is called the "kernel" of an Operating System. Android is software for mobile devices that includes operating systems, middleware and key applications. Application development on Android platform has used Java programming language [13] and [14]. 3.3. Architecture Design Figure 2 Flowchart parking information system In generally, the way the system works is to scan QR code which can appear randomly on smartphone with a smartphone camera, and then encoded using the parking information system applications and matched as existing in the database as server. The Flowchart parking information system shown, there are two flowcharts are connected to single database as server. user comes to scanning QR code for verification, if the code is not registered in the database, the user must perform the scanning process again, but if the user is already registered in the database then the vehicle can enter the parking area,

then the system would counter, so that if there are vehicles coming later, but it is over the counter will display a notification that the parking area is full. Similar to the park entrance, the parking process out is only depending on the process of reducing the counter so that the user can know the capacity of parking of vehicles [9], [12] and [13]. Figure 3 Waterfall Method – System Development Life Cycle This application system development was using the linear sequential. This method is the method most widely used by software developers. This method is commonly called the waterfall method which execution of a system carried out sequentially or linearly [13]. 3.4. Ideology Behind Application This parking information system application is based on the client-server architecture. Client-server is a system that performs both the functions of client and server so as to promote the sharing of information between them. It allows many users to have access to the same database at the same time, and the database will store much information [11]. Each smartphone will be installed this parking information system applications as client. The client is provided with an interactive Android based user interface for the process of pre-booking of parking slot. The server sides processing will be enabled using PHP and MySQL. The client requests the server for an ID data record and the server responds with capacity and data member. Figure 4 Client Server Architecture The results of the analysis then translated into the form of application design and infrastructure that can support the running of the application. The initial stage of application design is to determine the entity entities involved in parking management. The entities are: (1). security officer, who at once serves as a parking attendant; (2). administrative officer, who is responsible for inputting the registration data of the member parking and (3). Users, as the user of the parking lot. Once it can be defined the entities involved in the system then in the database design that will be used on the application. The preparation of the program is completed and the implementation of the application, it is necessary to perform maintenance or system maintenance, further implementation errors or additional application features may be added. However, in this study only done until the implementation stage and not yet in the maintenance phase 3.5. Management and Security System Retribution parking is one source of local revenue that can be expected to be a source of financing, regional development, and improve service quality for the community. Efforts to increase local revenues through parking fees are the task of local government. To keep information resources it would require a security management system to maintain the confidentiality, availability and integrity. There are 2 types of controls that are used in these applications, technical controls on access rights restrictions, database encryption and physical control [12] and [14]. Restriction of access rights is done through a graphical user interface, with user input and the password that has been provided. Encryption is done on a database that resides on the server, so that everyone who managed to hack into the database still can't read the contents of the database. While the physical control is done on a smartphone with a double lock, locking on smartphones and applications. 4. RESULTS AND ANALYSIS After the stage of preparation of code and testing is done then the next stage is the implementation of the application developed. At the time the application was first run by the parking attendant through the application installed on the android-based smartphone device. Local government informs this application by socializing to the community through online and offline social media. Local governments and their apparatuses actively socialize mobile- based eparchy applications in government-run parking centers such as: parking centers in the market, temporary parking on protocol roads and other public parking locations run by local government. The first step that resulted and informed in this research is the Local Government register parking applications through play store android, to be more accessible to the public. The initial process for users can download apps via android with e-parking application name. This process is important to

be done as agreement of the use of information between principal and user. For users who have downloaded can register by entering the ID card and complete financial data related to the parking financial deposit. The verification process will be done no later than 1 x 24 hours. After the registration process is complete the user can login process, in the information system page can be seen information about the availability of parking location and can be done parking location reservations if the user will go to the parking locations managed by the local government. The parking booking process can be done with the condition of available parking location (not full), by the system when the user make the booking will automatically receive notification to give response to the system such as the estimated time to arrive at the location and approve to receive QR code on e-parking application if exceed the time limit specified then booking is not valid. Until the parking area users will scan QR code. After performing QR-Code at the user entrance to the parking location in accordance with the area specified in the e-parking system and assisted by the parking attendant. The next steps after the parking process completed the user to the parking exit and perform a scan of QR-Code and the system will calculate the length of parking and parking fees that will be issued. Benefits and convenience that can be obtained by parking users with this e-parking model, among others, parking users can monitor the condition of the location of the parking in real time and users no longer have difficulty to get a parking lot in the locations of the parking is very crowded because the information system can be done booking place. In addition, when the payment is made in non-cash and users can also fill the parking money through several merchants (local retail merchant i.e. Indomart & Alfa) and parking attendants. There are some other facilities of this information system is the user can see the history of parking activities that can be used to help provide information about adverse events in the parking lot. Added again in this information system users can also communicate directly with the support staff when there are complaints and problems. In the experiment online, the parking system application process QR-Code scanning takes on average 1.9 seconds. 4 .1. Starting the Application The user needs to install the "Ayo Parkir" application on his Smartphone device with Android operating system. After installation, the icon of the app will show on the Home Screen of the user's device. "Ayo Parkir" application welcome screen will be flashed to the user on opening the application. Wait for connected to server for a moment and click to continue. The initial operation of this application is done by the local government principal on all smartphone devices that will be used and distributed to the parking staff. Initial installation of this application is very easy and fast only takes 0,5 - 1 minute. This application support with android operating system from generation highest until lowest, so local government can adjust budget to buy smartphone as main device of e-parking. 4.2. Report The button "view of data" on the form is useful admin reports to display the outgoing and incoming vehicles online for the management. From this report management can view date, time in, time out, ID and Name user and plate license number. Figure 5 Report Management 4.3. How to Test Mobile Based Information System An information system designed specifically for mobile devices, to be accessible anywhere and anytime. Mobile device itself can generally be interpreted as a device that has a small physical size, can be operated anywhere, mobile devices can provide voice and communication services messages can be in the form of exchanging text and images. Mobile devices can access information from the Internet network and display content from information systems. Android is a Linux-based system designed for touch-screen mobile devices such as smart phones and tablet computers. Android was originally developed by Android, Inc., with financial support from Google, which was later purchased in 2005. The operating system was officially released in 2007, in conjunction with the establishment of the Open Handset Alliance, a consortium of hardware,

software, and telecommunications that aim to advance the open standards of mobile devices. The Android user interface is based on direct manipulation, using touch input similar to real-world actions, such as swiping, tapping, pinching, and reversing pinch to manipulate objects on screen. Android is an open source operating system, and Google is releasing its code under the Apache License. Code with open source and licensing licenses on Android allows software to be freely modified and distributed by device makers, wireless carriers and app developers. In addition, Android has a large number of app developer communities that extend device functionality, commonly written in a customized version of the Java programming language. In this study, the authors conducted a simulation of the 50 vehicle for 4 days by attaching QR-Code, 50 vehicles conducted a simulation for the process of scanning on the entrance and exit of parking. After doing the simulation, the obtained average results of entrance 1.9 seconds. This time accounting standard for online speed results are influenced by the strong or weak signal, to accelerate results may input can connect the smartphone with wi-fi. 4.4. Related to Local Revenue Parking Tax is a reliable income for local revenue to optimize and increase local revenue required professional and transparent parking tax management. The solution to deal with leakage in the management of parking tax funds is to apply electronic parking or e-parking, so that the monitoring process on all matters relating to parking can be done well and impact on the increase of local revenue from the parking tax sector. In addition e-parking will also provide better service to the community in the field of parking. The expansion of revenue base undertaken by local governments aims to increase local government revenues through the expansion of the receipt of retribution. (2) strengthening the levy process; In the implementation stage, the strengthening of the levy process is done by dividing the parking staff into two, namely the parking staff in charge of carrying out the parking and also the coordinator of the parking staff in charge of receiving deposits from all parking charges from various regions. There is a division of tasks in accordance with their responsibility. Nevertheless, the target and realization of overall parking levy every year should not be realized in accordance with the overall target set, but as a reference to motivate the performance of local government apparatus associated with parking activities to continue to increase every year. (3) Improving Supervision; Supervision is done by fielding supervisors to the field regularly to ensure the performance of parking staff. They will be recorded the transaction activities in local financial reporting system. Parking administration fee charge indeed we have done innovation by using IT system and the results of parking fee retribution was done every day for 1 x 24 hours and at that time also result from parking levy per day paid to the local treasury which is financial revenue management office. 5. CONCLUSIONS Application of this parking system capable of changing the original manual processes into automated, making it easy to manage and search for the required vehicle data, and provides the recording and reporting of entry / exit vehicle for the management. Application of this parking system takes an average of 1.9 seconds to process the entry of vehicles, from the scanning process by inputting QR-Code plate number of the vehicle. Whereas in a manual process by distributing parking card, takes an average of 1.5 seconds. In terms of speed of service, the manual process is faster, but rather requires a lot of officers to give the card, lacking in terms of security, and reporting of managerial reports. The proposed e-parking system can manage the management of parking charges. Through this system the local government can monitor all parking transactions easily and in real time. The e-parking system is easy to maintain and develop, in addition to the e-parking support tools are easily obtained with a relatively cheap price. Involving parking staff in the implementation of e-parking is not expected to cause problems with the work of the parking staff, since the presence of parking staff is still needed. Use of e-parking can help local governments to increase local

revenue through the effectiveness of parking management. Leakage and loss of revenues generated from parking revenues can be eliminated with the support of parking accounting information systems. FUTURE SCOPES The system can further be enhanced by providing various options. By addition reservation online, GPS for empty space parking area by maps, payment of bill by various modes such as credit card etc. The development of e-parking must be sustained continuously with regional revenue improvement programs. More effective and robust android applications becomes the next research challenge in the future REFERENCES [1] Mahyuliza. 2017. Analysis of Effectiveness and Contribution of Tax Parking Receipts to The Original Regional Area of Medan City In 2013 – 2016. The 1st Unimed International Conference on Economics and Business 2017 (UNICEB), 12 Dec 2017, Medan. [2] Martha, I. H; Hadi, S. 2012. Analysis of Effectiveness and Parking Levy Gap in Malang Regency. Journal of Economics, Business, and Accountancy Ventura Volume 15, No. 1, pages 71 – 80. [3] Geys, B; Sorensen, R.J. 2016. Revenue Scarcity and Government Outsourcing. Public Administration. Vol. 94 Issue 3, p769-788. 20p. 4 Charts, 4 Graphs, 1 Map. DOI: 10.1111/padm.12262. [4] Thompson, M. F. 2013. State Revenue Collection through the Great Recession Indiana Business Review. Vol. 88 Issue 3, p8-12. 5p. [5] Murphy, B. 2013. Benefit of Mobile Commerce in the Pay Parking Industry. International Journal of Mobile Marketing. Vol. 8 Issue 1, p104-110. 7p. 1 Color Photograph, 2 Graphs. [6] Choné, P; Linnemer, L. 2012. A Treatment Effect Method for Merger Analysis with an Application to Parking Prices in Paris. Journal of Industrial Economics. Vol. 60 Issue 4, p631-656. 26p. 3 Color Photographs, 1 Diagram, 8 Charts, 1 Graph. DOI: 10.1111/joie.12003 [7] Pereira, J. 2012. Managing Risk: It's Just a Wheel, Stop and Right? Journal of Property Management. Vol. 77 Issue 1, p42-42. 1p. [8] Millard, B. A; Weinberger, R; Hampshire, R. 2013. Comment on Pierce and Shoup: Evaluating the Impacts of Performance. Journal of the American Planning Association. Vol. 79 Issue 4, p330-336. 7p. DOI: 10.1080/01944363.2014.918481. [9] Mc. Neal, M. 2013. If Parking Spots Could Talk. Marketing Insights. Vol. 25 Issue 3, p6- 7. 2p. [10] [Arief, B; Joko, T. 2016. Motor Vehicle Parking Information System Based on Android. Pilar Teknologi Volume 1 No 1, Pages 42-49 [11] Hunt, V. D., Puglia, Albert., Puglia, Mike. 2007. RFID - A Guide to Radio Frequency Identification. John Wiley & Sons. [12] Coleman, J. QRcodes: What Are They and Why Should You Care. Kansas Library Association Collage And University Libraries Section Proceedings. Kansas. 2011; Vol 1: p. 16-23. [13] Watene, G. Musiega, D. Ndegwa, C. A Gis Based Parking Management and Dissemination System. International Journal of Science and Research (IJSR). 2013; Vol.2 Issue 7: p 194-201. [14] Safaat, N. 2012. Smartphone Mobile Application Programming and Android-Based Tablet PC. Informatika Bandung. 2012. Development of Parking Accounting Information Systems Based Smartphone in Indonesia Hariadi Yutanto, Nanang Shonhadj, Romi Ilham and Diah Ekaningtias Development of Parking Accounting Information Systems Based Smartphone in Indonesia Hariadi Yutanto, Nanang Shonhadj, Romi Ilham and Diah Ekaningtias Development of Parking Accounting Information Systems Based Smartphone in Indonesia Hariadi Yutanto, Nanang Shonhadj, Romi Ilham and Diah Ekaningtias Development of Parking Accounting Information Systems Based Smartphone in Indonesia Hariadi Yutanto, Nanang Shonhadj, Romi Ilham and Diah Ekaningtias Development of Parking Accounting Information Systems Based Smartphone in Indonesia http://www.iaeme.com/IJCIET/index.asp 1013 editor@iaeme.com http://www.iaeme.com/IJCIET/index.asp 1014 editor@iaeme.com http://www.iaeme.com/IJCIET/index.asp 1015 editor@iaeme.com http://www.iaeme.com/IJCIET/index.asp 1016 editor@iaeme.com http://www.iaeme.com/IJCIET/index.asp 1017 editor@iaeme.com http://www.iaeme.com/IJCIET/index.asp 1018

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